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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is included. (AG)

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ED 059294

TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

CHEESE WRAPPER AND PACKER 920.887

S-16

(Supersedes XB-557)
S-16

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EDUCATION & WELFARE
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U. S. Employment Service
in Cooperation With
Wisconsin State Employment Service

U. S. DEPARTMENT OF LABOR

Washington, D. C.

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GATB #571
8-50

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY FOR CHEESE WRAPPER and Packer 920.887

S-16

SUMMARY

The General Aptitude Test Battery, B-1001, was administered by the Wisconsin State Employment Service to 61 Cheese Wrappers and Packers employed by the Outagamie Producers Corporation of Black Creek, Wisconsin, the Kraft Cheese Company of Beaver Dam, Wisconsin and the Woody's Cheese Company of Green Bay, Wisconsin in order to develop a selection battery for this occupation. The criterion used in developing this battery consisted of a performance rating made by the plant manager or foreman of each plant for each worker in his employ. The following aptitudes were found to be significant for this occupation: Aiming, Motor Speed, Finger Dexterity, and Manual Dexterity.

GATB Norms for Cheese Wrapper and Packer 920.887

The selection aptitude test battery for the occupation of Cheese Wrapper 6-06.450 consists of aptitudes A, T, F, M of the General Aptitude Test Battery. Applicants must meet the critical score on all aptitudes to be referred as test selected for this occupation.

Table I shows, for B-1001 and B-1002, the minimum acceptable score for each aptitude in the battery.

TABLE I

Minimum Acceptable Aptitude Scores on B-1001 and B-1002 for S-16

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
A	CB-1-C CB-1-K	90	K	Part 8	90
T	CB-1-G CB-1-K	85	F	Part 11 Part 12	85
F	CB-1-O CB-1-P	90	M	Part 9 Part 10	90
M	CB-1-M CB-1-N	95			

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Effectiveness of Norms

The data in Table IV indicate that 13 of the 21 poor workers, or 62% of them, did not achieve the minimum scores established as cutting scores on the recommended test norms. This shows that 62% of the poor workers would not have been hired if the recommended test norms had been used in the selection process. Moreover 31 of the 39 workers who made qualifying test scores or 79% were good workers.

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TECHNICAL REPORT

I. Problem

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Cheese Wrapper and Packer 920.887

II. Sample

The sample consists of three groups of Cheese Wrappers employed by the Outagamie Producers Corporation of Black Creek, Wisconsin, the Kraft Cheese Company of Beaver Dam, Wisconsin, and the Woody's Cheese Company of Green Bay, Wisconsin. Sixty-three workers were tested at these three plants: 21 from the Outagamie Producers Corporation; 14 from the Kraft Cheese Company, and 28 from the Woody's Cheese Company. Of the 63 tested, 2 were eliminated from the sample; one because of age and one because of failure to follow test instructions.

All the workers were hired on the basis of a personal interview. No tests were used for screening purposes and no educational requirement was made.

Table II shows the Means (M), Standard Deviations (σ), Ranges, Biserial Correlations with the Criterion (r_{bis}), and Standard Errors of Correlations ($\sigma_{r_{bis}}$) for age, education, experience for the total sample of 61 workers.

TABLE II

Means (M), Standard Deviations (σ), Ranges,
Biserial Correlations with the Criterion (r_{bis}) and
Standard Errors of Correlations ($\sigma_{r_{bis}}$) for Age, Education and Experience

N = 61

	M	σ	Ranges	r_{bis}	$\sigma_{r_{bis}}$
Age	25.61	8.00	17-54	-.228	.157
Education (yrs.)	9.74	2.23	3-16	.124	.162
Experience (mos.)	14.90	11.45	1-58	.417	.142

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Insofar as this sample is concerned, the relationships between the criterion and age and education are not significant. The correlation of .417 between experience and the criterion, with a standard error of .142, shows that there is a tendency for the more experienced workers to be rated higher. This correlation for the total sample is due primarily to the relationship in the sample from the Woody's Cheese Company, for which there was a biserial correlation coefficient of .831 with standard error of .112 between criterion ratings and experience. Therefore a statistical correction was applied to the rankings for this company, which resulted in three of the low production workers being reclassified as high and two of the high production workers being reclassified as low. As a result of this correction the correlation between the criterion and experience for Woody's Cheese Company sample became .383 with a standard error of .219.

III. Job Description

Job Title: Cheese Wrapper and Packer 920.887

Job Summary: Wraps and seals pre-cut pieces of cheese by hand in a transparent air-tight wrapper.

Work Performed:

Places blocks or pre-cut pieces of cheese on wrapper and rapidly folds long ends of wrapper toward center of cheese, sealing wrapper by rubbing with fingers. Turns cheese and folds end of wrapper in with fingers and thumbs. Rubs wrapped end on bench surface to seal wrapper. Repeats same operation on other end of cheese and places it on conveyor belt. May rotate to any of the following tasks: Cheese Cleaning - removes outer wrapper and scraps mold or other foreign matter from blocks of cheese with paring knife; Cheese Cutting - places block of cheese on lower die of vacuum-pump cutting machine, actuates lever to cause cheese to be cut and places cut pieces of cheese on trays; Cheese Weighing - weighs individual pieces of cut cheese on scale to proper weight and carries trays of weighed cheese to wrapping table and carries imperfect pieces to salvage table; Wrapper Cutting - cuts sheets of wrapping material to proper length; Inspecting - visually inspects wrapped cheese at end of conveyor belt for perfect folds in wrapping and inserts pieces of tissue paper between rows of wrapped cheese; Carton Packing and Stamping - packs wrapped pieces of cheese in cardboard cartons for shipping and stamps identifying insignia on cartons.

IV. Experimental Battery

All of the parts of the General Aptitude Test Battery, B-1001, were administered to the sample group.

V. Criterion

The criterion consists of a performance rating made by the plant manager, the foreman, or a combined rating of both manager and foreman of each plant for each worker employed. From these ratings the total sample was combined arbitrarily. Approximately the lower one-third of each sample was included in the lower efficiency group and the higher two-thirds of each sample was included in the higher efficiency group. The ratings for the Woody's Cheese Company sample were corrected for experience before this sample was divided into higher and lower efficiency workers.

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VI. Statistical and Qualitative Analysis

No attempt has been made to analyze the three subsamples separately since each sample is small. The criteria, the work performed and the training period in each plant are sufficiently comparable to warrant combining the three subsamples.

Table III shows the Means (M), Standard Deviations (σ), Biserial Correlations with the Corrected Criterion (r_{bis}), and Standard Errors of the Correlation ($\sigma_{r_{bis}}$) for each of the aptitudes of the General Aptitude Test Battery.

TABLE III

Means (M), Standard Deviations (σ),
Biserial Correlations with the Corrected Criterion (r_{bis})
and Standard Errors of Correlations ($\sigma_{r_{bis}}$)
for each Aptitude of the General Aptitude Test Battery

N = 61

Aptitude	M	σ	r_{bis}	$\sigma_{r_{bis}}$
G	96.5	15.2	.120	.164
V	92.1	13.2	.158	.162
N	98.6	17.9	.130	.163
S	101.6	18.0	.231	.159
P	110.7	18.5	.307	.153
Q	99.6	16.2	.276	.156
A	105.6	16.1	.430	.142
T	100.0	16.5	.367	.148
F	113.2	18.2	.030	.165
M	115.7	19.9	.227	.159

In interpreting Table III consideration should be given to the following:

A. The job analysis indicates that the following aptitudes measured by the General Aptitude Test Battery are important for the occupation of Cheese Wrapper:

1. Manual Dexterity (M) - required in placing pieces of cheese on wrapper, turning cheese over, and rubbing wrapped edge on bench surface to seal wrapper.

2. Aiming (A) - required in placing piece of cheese on the middle of wrapper so that brand name covers the top of cheese.

3. Finger Dexterity (F) - required in folding ends of wrapper with fingers and thumbs.

4. Motor Speed (T) - required in rapidly handling pieces of cheese and wrapping them.

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B. Aptitudes A, T, F and M all have relatively high mean scores. Aptitudes F and M have the highest means of any aptitudes for this sample. Aptitude P also has a high mean and is probably involved in the job. Aptitude S has a mean score of above 100 but does not seem to be important on the basis of job analysis data.

C. Aptitudes A, T and P shows significant correlation with the criterion.

The selective efficiency of various combinations of significant aptitudes and minimum scores was evaluated by means of the tetrachoric correlation technique. On the basis of all considerations, including both qualitative and quantitative factors, Aptitudes A, T, F and M were selected for inclusion in the test norms. Aptitudes A and T were selected on the basis of relatively high mean scores, significant correlation with the criterion and job analysis data. Aptitudes F and M were selected on the basis of relatively high means and job analysis data.

Although there was some evidence to warrant consideration of Aptitude P for inclusion in the test norms, Aptitude P did not add to the selective efficiency of the norms and, therefore, was not included.

Cutting scores for Aptitudes A, T and M were set at one standard deviation unit below the mean of each aptitude and rounded to the nearest five-point score levels; the cutting score for Aptitude F was set one sigma below the mean and rounded to the lower adjacent five-point score level, which resulted in better selective efficiency. Thus the resulting norms consist of A-90, T-85, F-90 and M-95.

VII. Concurrent Validity of Norms

For the purpose of computing the tetrachoric correlation coefficient between the test norms and the criterion and applying the Chi Square test, the criterion was dichotomized by placing approximately the top two-thirds of the sample into the high criterion group and the remainder of the sample into the low criterion group. Table IV shows the relationship between test norms consisting of A-90, T-85, F-90 and M-95 and the dichotomized criterion. Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

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TABLE IV

Relationship Between Test Norms Consisting of Aptitudes A, T, F and M with Critical Scores of 90, 85, 90 and 95, Respectively and the Criterion for Cheese Wrapper and packer 920.887

N = 61

	Non Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	9	31	40
Poor Workers	13	8	21
Total	22	39	61

$r_{tet} = .60$ $\quad x^2 = 7.643$

$\sigma_{r_{tet}} = .21$ $\quad P/2 < .005$

The data in the above table indicate a significant relationship between the test norms and the criterion for this sample.

VIII. Conclusions

On the basis of all the foregoing considerations, Aptitudes A, T, F and M with minimum scores of 90, 85, 90 and 95, respectively are recommended as B-1001 norms for the occupation of Cheese Wrapper and Packer the equivalent B-1002 norms consist of K-90, F-85 and M-90.